of Aihara). However, contrary to the Office Action assertion, there is no suggestion from Figs. 8A and 8B of Aihara to one skilled in the art to have an optical socket attached to an optical plug on the other surface side of the transparent substrate, as recited in claim 1.

Although Figs. 8A and 8B are a modified version of the embodiment of Fig. 5, the only difference is that a receptacle 62 and a connector 61 are provided so that the connector 61 can be detached from receptacle 62 (col. 7, lines 57-61). As Aihara describes, Fig. 8 illustrates a modified form of the Fig. 5 embodiment, in which the optical fiber 15 and the transparent structure 31 are equipped with a connector 61 and a receptacle 62, respectively, so that the former is detachably mounted on the latter (col. 7, lines 57-61). Accordingly, the only suggest from the teachings of Aihara is that the connector 61 is detachably mounted to the receptacle 61 (Figs. 8A and 8B).

Further, as shown in Figs. 8A and 8B of Aihara, the guide surfaces (i.e., engaging portions 68 of Aihara) of the optical socket (i.e., receptacle 62 of Aihara) are not substantially orthogonal to the another surface of the transparent substrate (i.e., transparent structure 31 of Aihara), and one surface substantially parallel to the another surface of the transparent substrate (i.e., transparent structure 31 of Aihara), as recited in claim 1. As Aihara teaches, the engaging pieces 65 of the connector 61 are elastically pushed outward in the opposite directions by the tapered surfaces of the engaging portions 68 (col. 8, lines 22-26). The hooks 66 slide over engaging portions 68 and snap elastically into engagement with the side surfaces of the engaging portions 68 on the side thereof facing the positioning surface 33, thereby assembling the connector 61 and the receptacle 62 into a unitary structure (col. 8, lines 22-30). Accordingly, engaging portions 68 are not substantially orthogonal to the another surface of the transparent substrate and do not have one surface substantially parallel to the another surface of the transparent substrate, as recited in claim 1.

Thus, there is no suggestion from Figs. 8A and 8B of Aihara to one skilled in the art to have an optical module that includes, in part, an optical socket, which is arranged on one side of the transparent substrate and to which the optical plug is attached, the optical socket having guide surfaces to position the optical plug, the guide surfaces include two surfaces substantially parallel to each other and substantially orthogonal to the another surface of the transparent substrate, and one surface substantially parallel to the another surface of the transparent substrate, as recited in claim 1.

Because Aihara does not disclose, teach or suggest the features of claim 1, Aihara cannot render obvious the subject matter of claims 2-5, 12, 14-18, 20-23, and 26, which depend from claim 1, for the reasons discussed with respect to claim 1 and for the additional features recited therein. It is respectfully requested that the rejection be withdrawn.

The Office Action rejects claims 6-9 and 19 under 35 U.S.C. § 103(a) over Aihara in view of Yeh et. al. (Yeh), U.S. Patent No. 6,846,113 and Ouali et. al. (Quali), U.S. Patent No. 6,556,747. The rejection is respectfully traversed.

None of the applied references individually or in combination thereof disclose, teach, or suggest an optical module that includes an optical socket, which is arranged on one side of the transparent substrate and to which the optical plug is attached, and which is adapted to guide the signal light to or from a second lens formed in the optical plug and a first lens formed in the optical socket, which converges the signal light emitted from the optical element to guide the signal light to the reflective portion, or converges the signal light, emitted from the optical transmission path and reflected by the reflective portion, to guide the signal light to the optical element, as recited in claim 6.

None of the applied references individually or in combination thereof disclose, teach, or suggest a manufacturing method of an optical module that includes arranging an optical element on the one side of the transparent substrate corresponding to each wiring layer;

mounting an optical socket, corresponding to the optical element, on another side of the transparent substrate, the optical socket being adapted to guide a signal light to or from a lens formed in an optical plug, and having guide surfaces to position the optical plug, the guide surfaces include two surfaces substantially parallel to each other and substantially orthogonal to the another side of the transparent substrate, and one surface substantially parallel to the another side of the transparent substrate; and cutting and dividing the transparent substrate into the plurality of regions, as recited in claim 19.

As the Office Action recognizes, Aihara fails to disclose an optical socket attached to an optical plug on the ones side of the transparent substrate or a second lens formed in the optical plug, as recited in claims 6. Further, the Office Action recognizes that Aihara fails to disclose cutting and dividing the transparent substrate into a plurality of regions or that lens are formed in the optical plug, as recited in claim 19.

Additionally, for at least the same reasons as discussed above with respect to claim 1, Aihara does not disclose or suggest an optical socket which is arranged on one surface of the transparent substrate and to which the optical plug is attached as recited in claim 6. Also, Aihara does not disclose or suggest that the optical socket has guide surfaces to position the optical plug, the guide surfaces include two surfaces substantially parallel to each other and substantially orthogonal to the another side of the transparent substrate, and one surface substantially parallel to the another side of the transparent substrate, as recited in claim 19.

Further, Aihara fails to disclose or suggest a first lens (convexity 45 of Aihara) formed in the optical socket (see Figs. 3 and 4 of Aihara). As clearly shown in Figs. 3-4 of Aihara, the convexity 45 is formed in the underside of the transparent structure 31 facing the light emitting device 37 in the embodiment of Fig. 1 so that the convexity 45 serves as a lens (col. 5, lines 50-53). Accordingly, Aihara does not disclose or suggest a first lens formed in the optical socket.

Both Yeh and Ouali fail to overcome the deficiencies of Aihara for at least the same reasons as discussed above with respect to independent claims 6 and 19.

Further, Ouali teaches a chemical mill method for forming a microlens 12 and an attachment structure 13 (Figs. 3A-3D of Ouali). Yeh teaches method of permanently fixing an optical fiber with sub-micron precision inside a high power pump laser module (col. 2, lines 1-5 of Yeh). Accordingly, both teachings of Ouali and Yeh are not directed to including lens in an optical plug. Thus, it would not have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the optical module of Aihara using the teachings of Ouali and Yeh to achieve the desired features as recited in independent claims 6 and 19.

Accordingly, the alleged combination fails to disclose or suggest all of the features recited in independent claims 6 and 19, as well as the additional features recited in claims 7-9 depending from claim 6. It is respectfully requested that the rejection be withdrawn.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of all pending claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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